FSEC Advisory Board Meeting

November 4, 2022

Agenda

Time	Description	Speaker
9:30 a.m.	Welcome	Bill Grieco, Chair, FSEC Advisory Board; Director, Office of Sustainability & Resilience, City of Orlando
	Introductions (Roll Call)	Sherri Shields, Communications Director, FSEC
9:45 a.m.	Approval of April 15, 2022 Minutes	Bill Grieco, Chair
9:50 a.m.	Status of FSEC Programs	Jim Fenton, Director, FSEC
10:30 a.m.	Florida Energy Office Report; Inflation Reduction Act	Kelley Smith Burk, Director, Office of Energy, FDACS
	Florida Legislative Session Report	Louis Rotundo, Principal, Louis Rotundo and Associates
11:00 a.m.	Collaborative Opportunities for FSEC and Board Member Companies in Meeting Sustainability Goals 1. Review Survey Results 2. Discuss Partnership and Funding Opportunities 3. Develop Working Groups for Future Collaborations	Jennifer Szaro, Vice Chair, FSEC Advisory Board; President and CEO, Association of Energy Services Professionals (AESP)
11:55 a.m.	Date and Agenda for Next AB Meeting (TBD)	
12:00 p.m.	Adjourn to Lunch	

Tommy Boroughs

June 13, 1939 – July 15, 2022

- Longtime FSEC Advisory Board Member; Chair (2009-2011)
- Chair of the Florida Energy Commission (2006-2008)
- President of the Board of Orlando Utilities Commission (2004-2006). Served on the Board (2001- 2008)
- Chaired the American Public Power Association's Policy Makers Council in 2005 and 2006, and served as a member of the Board of Directors of the Association.
- Former Governor Jeb Bush appointed Mr. Boroughs to the Florida Energy Forum in 2005
- Florida Governor Charlie Crist appointed Mr. Boroughs to the Governor's Energy and Climate Action Team in 2007
- Florida Municipal Electric Association Member of the Year 2006
- Prolific volunteer in the Orlando community

https://www.legacy.com/us/obituaries/orlandosentinel/name/tommy-boroughs-obituary?id=35903465

Congratulations

Chris Castro

- Chief of Staff,
  Office of State and Community Energy Programs, DOE
- FSEC Advisory Board Chair (2020-2022)

New Advisory Board Members

Hector Rivera Russe

President,
Aireko Energy Group

Winston Schoenfeld

Interim Vice President of Research, UCF

Agenda

Time	Description	Speaker
9:30 a.m.	Welcome	Bill Grieco, Chair, FSEC Advisory Board; Director, Office of Sustainability & Resilience, City of Orlando
	Introductions (Roll Call)	Sherri Shields, Communications Director, FSEC
9:45 a.m.	**Approval of April 15, 2022 Minutes**	**Bill Grieco, Chair**
9:50 a.m.	Status of FSEC Programs	Jim Fenton, Director, FSEC
10:30 a.m.	Florida Energy Office Report; Inflation Reduction Act	Kelley Smith Burk, Director, Office of Energy, FDACS
	Florida Legislative Session Report	Louis Rotundo, Principal, Louis Rotundo and Associates
11:00 a.m.	Collaborative Opportunities for FSEC and Board Member Companies in Meeting Sustainability Goals 1. Review Survey Results 2. Discuss Partnership and Funding Opportunities 3. Develop Working Groups for Future Collaborations	Jennifer Szaro, Vice Chair, FSEC Advisory Board; President and CEO, Association of Energy Services Professionals (AESP)
11:55 a.m.	Date and Agenda for Next AB Meeting (TBD)	
12:00 p.m.	Adjourn to Lunch	

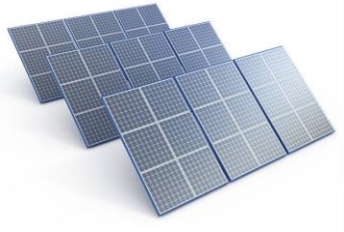
Status of FSEC Programs

Jim Fenton, Director

Advisory Board Meeting

November 4, 2022

FSEC Principal Energy Program Areas



Solar

High Performance Buildings

Sustainable Transportation

Storage

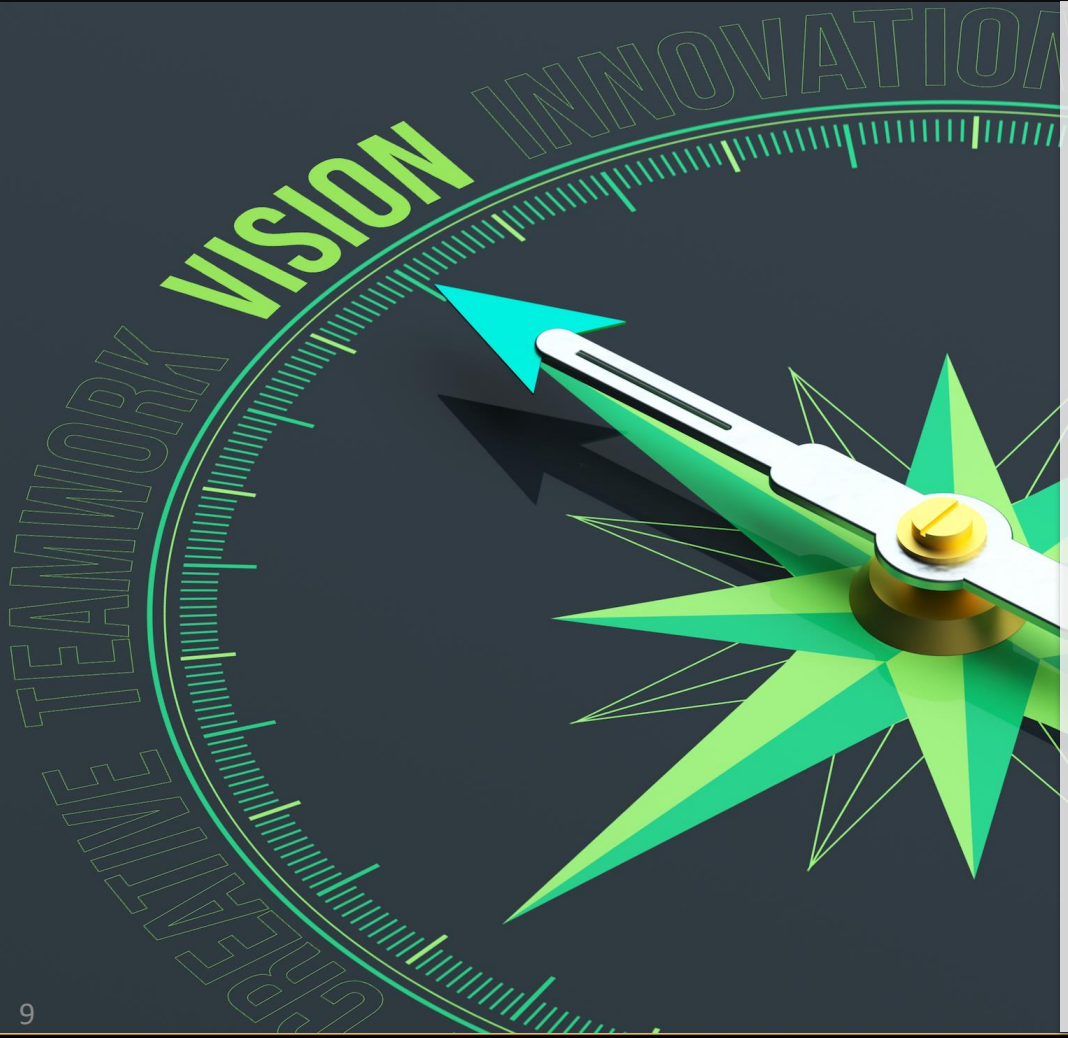
Energy Systems Integration

Education and Training

Policy

FSEC

UCF



VISION

Promote the rapid transition to a sustainable energy economy through renewable energy, energy efficiency, and sustainable transportation research, demonstration, and education.

MISSION

Develop, research, and evaluate energy technologies that enhance the environment and economy, and transfer the results to the public, students and practitioners.

Vision for Florida

Spend Little to No Funds on Imported Primary Fuels

100% Renewables Using Florida Energy

- Building Energy Efficiency Improvements
- Utility & Rooftop Solar
- Energy Storage
- Transportation Electrification
- Smart-charging Electric Vehicles (V2G)
- Demand Response

100% Renewables & Net Zero Emissions

- Sustainable aviation fuels
- High-speed electric trains
- Hydrogen as a fuel and feedstock

FSEC UCF

Advisory Board Partners

Energy Consumers

amazonfresh

CITY OF ORLANDO

Publix

UNIVERSAL ORLANDO RESORT

The Walt Disney Company

Builders/ Energy Providers

C.T. HSU + ASSOCIATES, P.A.
ARCHITECTURE • PLANNING • INTERIOR DESIGN

kb HOME

LifeStyle SINCE 1984 solar-powered HOMES

Nova EV CHARGE Empowering The Future

Palm Harbor Homes

esa

Electric Utilities

DUKE ENERGY

FMPA MUNICIPAL POWER

FPL

KUA KISSIMMEE UTILITY AUTHORITY

OUC The Reliable One

Manufacturers

innventure

HITACHI Inspire the Next

JinKO Solar
Building Your Trust in Solar

MITSUBISHI ELECTRIC
COOLING & HEATING

saft

TRANE TECHNOLOGIES watsco

Associations/ Government

AESP

DRIVE ELECTRIC FLORIDA

FLORIDA DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES

FlaSEIA
Florida Solar Energy Industries Association

GULF COAST ENERGY NETWORK

SHEA
SOUTHEAST H2 ENERGY ALLIANCE

UCF

FSEC Project Current Partners

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Buildings Technology Office

SOLAR ENERGY TECHNOLOGIES OFFICE
U.S. Department Of Energy

Pacific Northwest NATIONAL LABORATORY

RESNET
RESIDENTIAL ENERGY SERVICES NETWORK

A.F.Mensah

OWENS CORNING

NREL
Transforming ENERGY

ICC-SRCC
SOLAR RATING & CERTIFICATION CORPORATION

ATLANTIC HOUSING PARTNERS

SEI Associates

ASHRAE

CENTRAL FLORIDA CLEAN CITIES COALITION

Sandia National Laboratories

ASU Arizona State University

Tactical Energy

DRIVE ELECTRIC USA

Associated Gas Distributors of Florida

The Levy Partnership

FPL solar now

NSF

SEMINOLE COUNTY
FLORIDA'S NATURAL CHOICE

FlaSEIA
Florida Solar Energy Industries Association

M2X

OUC The Reliable One

UCF

NEW CONTRACT AWARD

- **Clean, Affordable, and Resilient Energy Systems (CARES) for Socially Vulnerable and At-Risk Communities**
- **DOE Award Amount:** $1 million
- **Awardee Cost Share:** None
- **Principal Investigator:** Kristopher Davis
- **Project Description:** This project is developing a geospatial framework to optimize the deployment of solar-plus-storage for the most vulnerable and at-risk communities in Central Florida and the Florida Panhandle. The research team will determine the relationship between extreme weather events and grid outages to quantify vulnerability and risk before selecting the optimal location to site solar and solar-plus-storage.

https://www.energy.gov/eere/solar/renewables-advancing-community-energy-resilience-racer-funding-program#map

CURRENT PROGRAMS

Current DOE-Funded Collaborative Partnerships

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

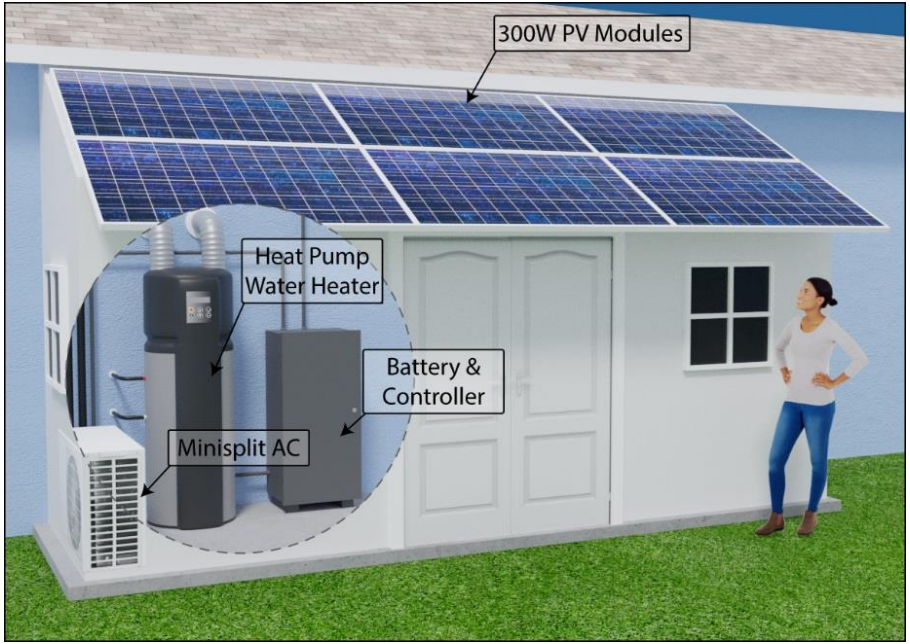
Buildings Technology Office

- **Investigation of the Prevalence and Energy Impacts of Residential Comfort System Faults – Hot Humid and Hot Dry Climates,**
  E. Martin
- **PV-GEMS: Photovoltaic Powered, Grid Enhanced Mechanical Solution, Phase 2**
  E. Martin
- **Reimagining HVAC for New Manufactured Housing, Phase 2**
  (Subaward from Slipstream),
  D. Chasar

  New project
- **Indoor Air Quality Field Study in New US Homes,**
  E. Martin
- **Energy Codes: Comparing Performance in a Changing Technological Environment,**
  P. Fairey
- **EnergyPlus Software Development and Technical Assistance,**
  L. Gu

FSEC™ UCF

Energy Systems Integration



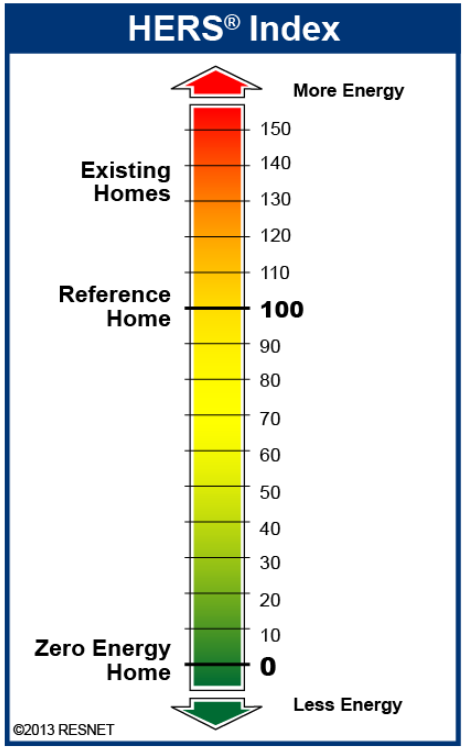
A pre-packaged retrofit solution targeting 75% reduction in space conditioning and water heating energy.

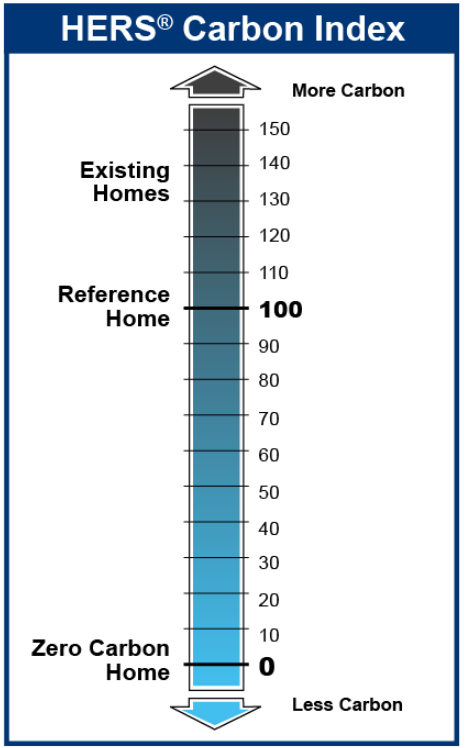
- PV GEMS: PV-Powered, Grid-Enhanced Mechanical Solution
- $4.4M ($3.6M + $885k cost share)
- Development of pre-production prototypes, demonstration in occupied buildings, and commercialization activities.
- Currently collecting data in test facility to evaluate the viability of integrating a larger capacity, centrally ducted heat pump instead of a small capacity ductless mini-split.
- Partners: watsco COOLING THE AMERICAS, ROC usa Resident Owned Communities BETTER TOGETHER, Rheem, NASEO National Association of State Energy Officials, UCF

Contact: Eric Martin, martin@fsec.ucf.edu

CO_2e Index

- First-of-its-kind tool that can calculate how much carbon dioxide buildings and homes produce.
- FSEC Deputy Director, Philip Fairey, worked with RESNET to develop.
- Fairey presented at ASHRAE in Athens, Greece on Oct. 5





https://www.ucf.edu/news/new-tool-calculates-greenhouse-gas-emissions-from-buildings/

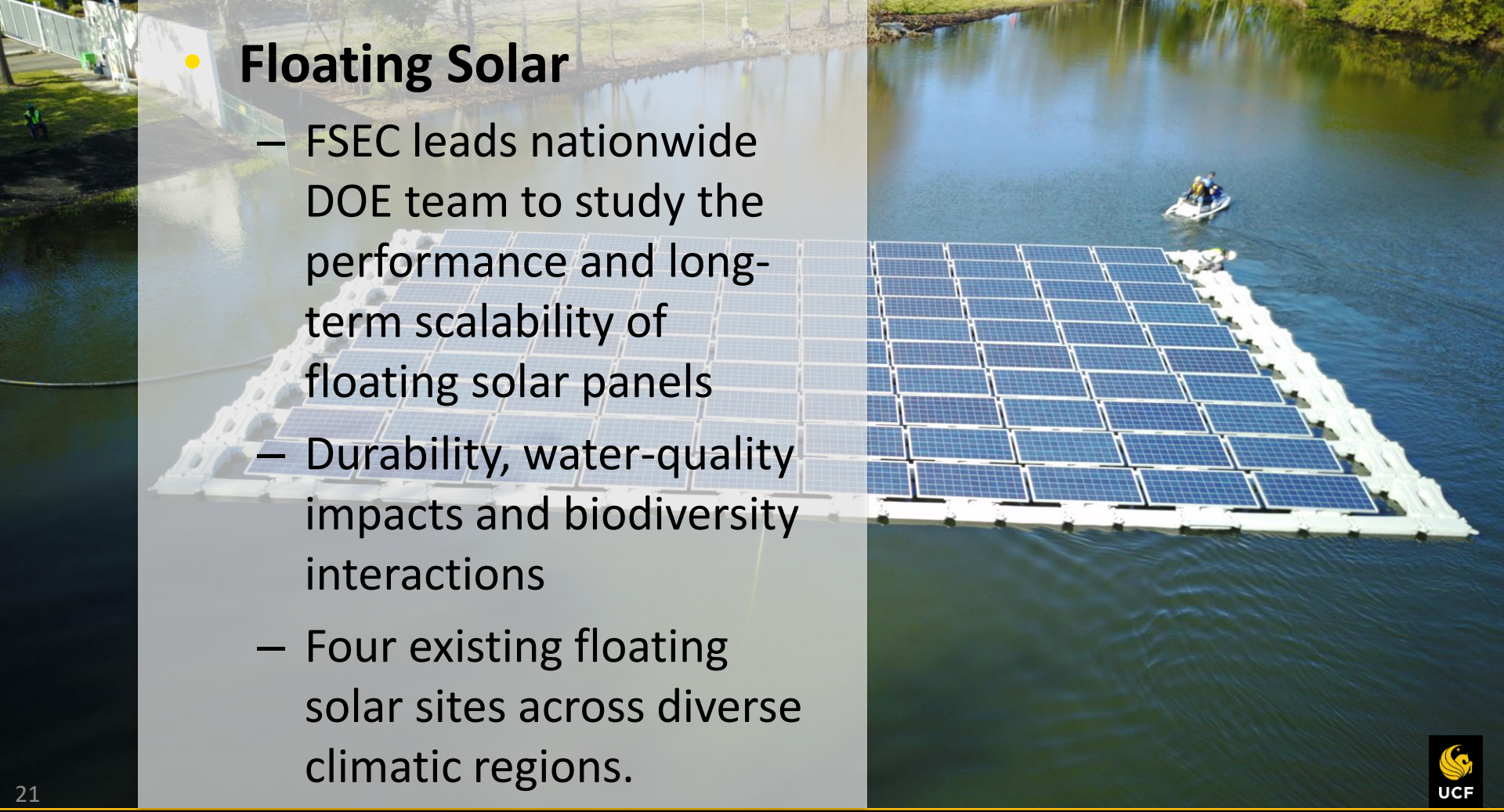
Current DOE-Funded Collaborative Partnerships

- **Gaining Fundamental Understanding of Critical Failure Modes and Degradation Mechanisms in Fielded Photovoltaic Modules via Multiscale Characterization,** *K. Davis*
- **Reliability and Power Degradation**, Sub from CWRU*, K. Davis*
- **Characterization of Contact Degradation in c-Si PV Modules**, *K. Davis*
- **Fabrication of Passivating Contact Solar Cells,** *K. Davis*
- **Low Cost Printing Techniques***, K. Davis*
- **Remotely operated High Voltage Measurement System for IPG's High Altitude Cost-per-Watt study,** *H. Seigneur*

New project

- **Education Materials for Professional Organizations Working on Efficiency and Renewable Energy Developments (EMPOWERED)**, *C. Kettles*
- **Developing PID susceptibility models for Bifacial Technologies**, *H. Seigneur*
- **PV System Research Impacting LCOE**, *H. Seigneur*
- **Quantifying and Valuing Fundamental Characteristics and Benefits of Floating Photovoltaic Systems,** *J. Sherwin*
- **Secure and Resilient Operations Using Open-Source Distributed Systems Platform (OpenDSP)**, *W. Sun*

FSEC™ UCF



Floating Solar

- FSEC leads nationwide DOE team to study the performance and long-term scalability of floating solar panels
- Durability, water-quality impacts and biodiversity interactions
- Four existing floating solar sites across diverse climatic regions.

Methane Removal

SOLVE THE FLARING PROBLEM AND MONETIZE TRADITIONALLY UNECONOMIC GAS STREAMS

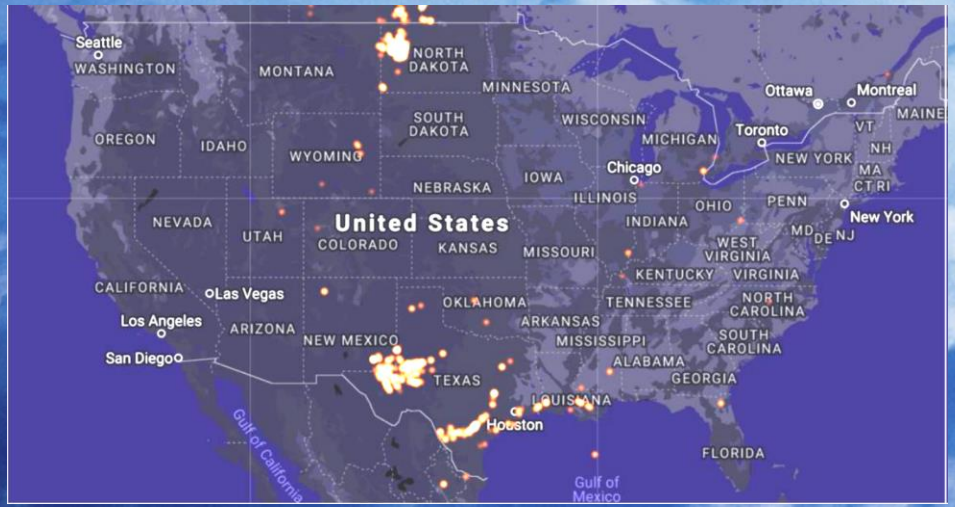
MISSION

- Methane capture and conversion to liquid methanol
- 16k flare sites globally

Methane Removal

Methane is 30 times more potent GHG than CO_2

Heat map showing prevalence of flaring in the United States for 2021. [source: skytruth.org]



In 2020, **164.9 MMT CO_2 Eq. of CH_4** was emitted from the oil and natural gas mining in the US (Second largest source of methane emission)

Source: EPA

SunSmart Schools Emergency Shelter Program

2010-2014

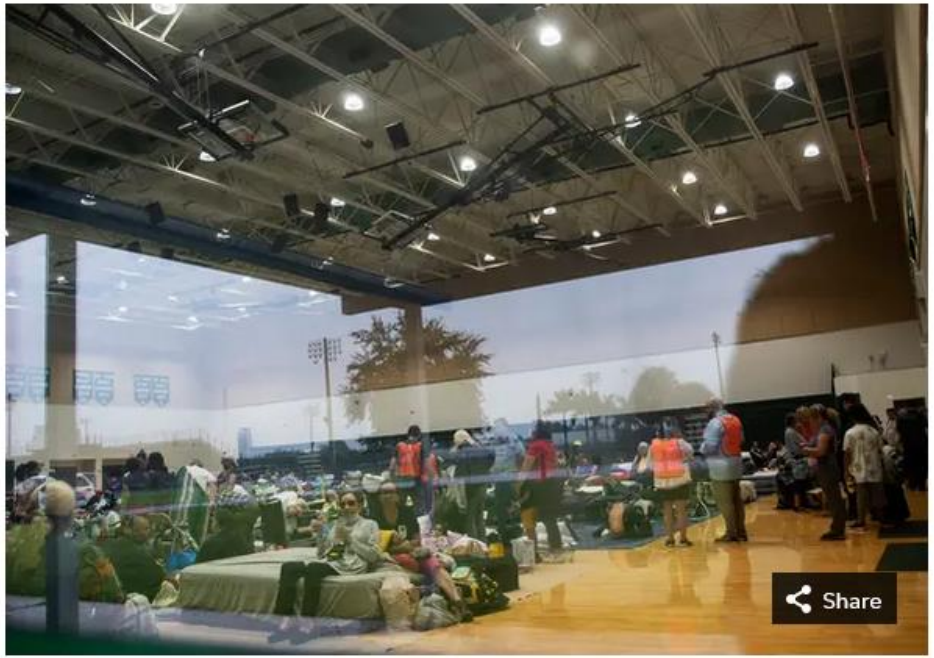
- Funded by American Reinvestment and Recovery Act (ARRA), through FEO – $10M

2019-Present

- Inspections & Repairs at 113 schools
- Over $2M from FDACS to make upgrades
- Replace batteries, upgrade inverters, or other needed repairs

SunSmart Schools E-Shelter Project

- Currently, 72 sites completed
- Island Coast High School only shelter in Lee County open ahead of Hurricane Ian
- Shelter powered by SunSmart E-Shelter's PV system functioned but depleted nearly six hours earlier than expected, as it was serving multi-purposes
- Science teacher powered tilapia fish tanks that were key to the agribusiness/aquaculture/ sustainability program. The health of the fish required aeration 24 hours a day.



People get settled into the gym at Island Coast High School in Cape Coral on Tuesday, Sept. 27, 2022. Island Coast is the only shelter in Cape Coral that is open ahead of Hurricane Ian.

AMANDA INSCORE/THE NEWS-PRESS USA TODAY NETWORK-FLORIDA

SunSmart Schools E-Shelter Project

Timothy Gallagher *(left),* Bill Mize, and Luis Bolanos

Bill Young showing the younger crew members how to take a shade break.

Bill Young and David Bittle explaining the PV repairs to one of the schoolyard residents living near the array.

Vanessa Bundy in the field.

FSEC UCF

Florida

SOLAR ENERGY

Apprenticeship Program

Solar Energy Technician

- **First and only solar apprenticeship program in the country registered with the US Department of Labor**
- FSEC and FlaSEIA partnership
- Pathway to solar contractor license or higher education
- FSEC developing and producing online training and instructional materials
- Launches December 8

https://floridasolarapprentice.com/

STANDARDS OF APPRENTICESHIP

Florida Solar Energy Apprenticeship Program, GNJ 2022-FL-111515

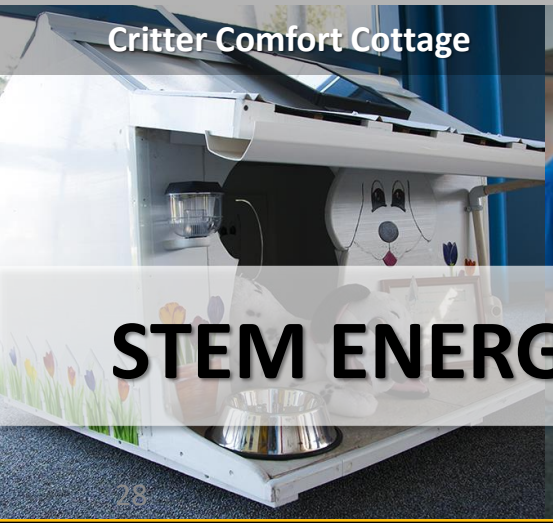
REGISTERED BY
FLORIDA DEPARTMENT OF EDUCATION
DIVISION OF CAREER AND ADULT EDUCATION
APPRENTICESHIP SECTION

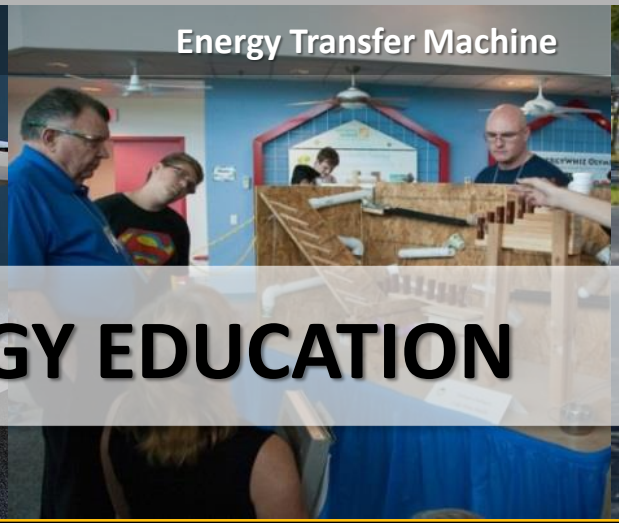
UCF


Solar Energy Cook-off

Energy Innovations

Junior Solar Sprint


Critter Comfort Cottage


Energy Transfer Machine


Electrathon

STEM ENERGY EDUCATION

EnergyWhiz, https://vimeo.com/9522310

EnergyWhiz

Empowering Student Innovation for a Clean Energy Future

EnergyWhiz is a forum for elementary, middle and high school students to demonstrate their STEAM capabilities through project-based, energy-focused learning activities.

Junior Solar Sprint

Critter Comfort Cottage

Solar Energy Cook-off

Energy Inspired Art

Energy Transfer Machine

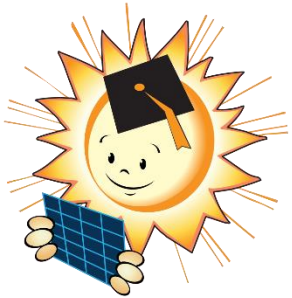
For more information, contact:
Penny Hall
321-638-1018
penny@fsec.ucf.edu

FSEC

UCF

www.energywhiz.com

EnergyWhiz Sponsorships

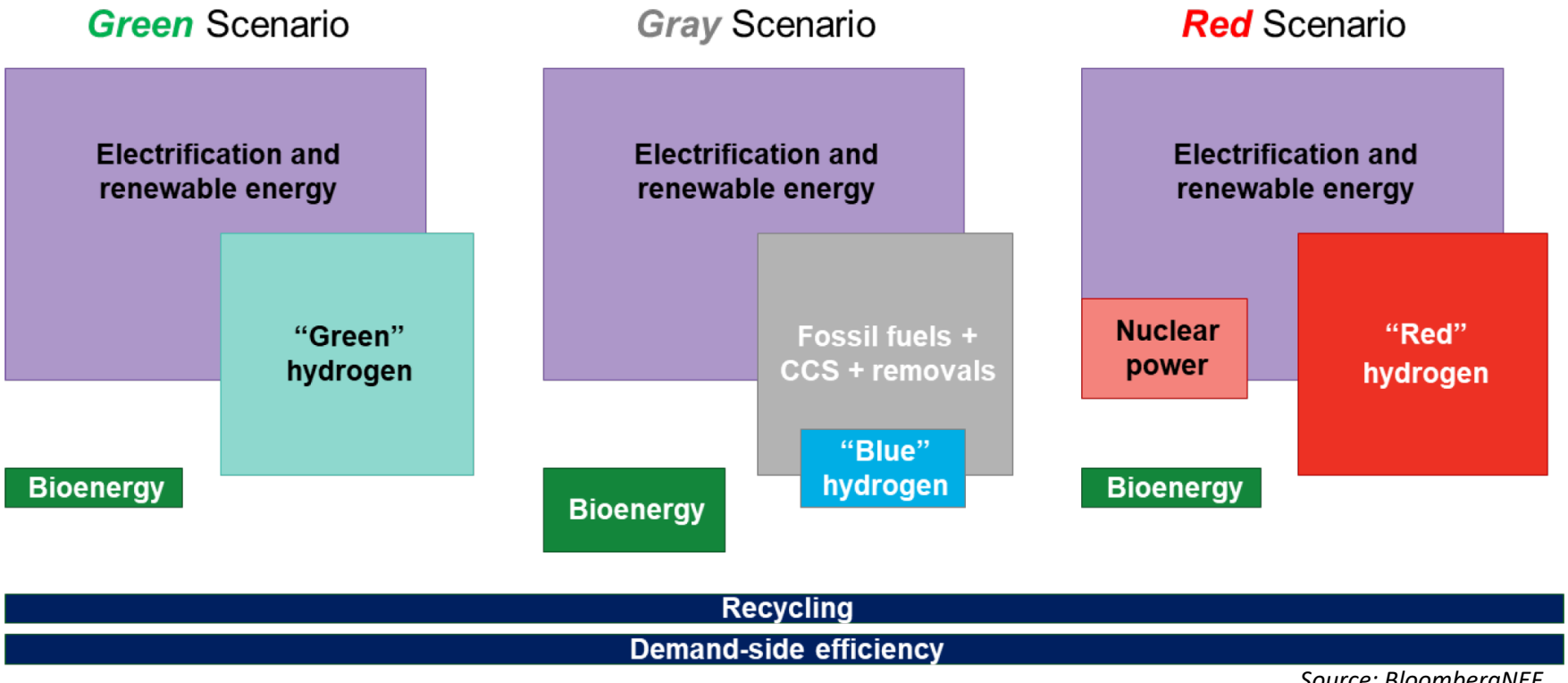


- Sponsorship
  - Pays for rental of equipment, medallions and trophies for students, county and facilities fees, labor, teacher workshops, competition materials for student teams, teacher recognition gift cards, registration fees, etc.
  - Supports EnergyWhiz Expos – we can bring the in-person experience to a specific place reaching more students. Creates a positive public relations and outreach opportunity for your organization.
- Any amount of sponsorship helps and we can customize your benefits
- Volunteers Needed

https://www.energywhiz.com/sponsor-energywhiz/

SUSTAINABILITY GOAL PARTNERSHIPS

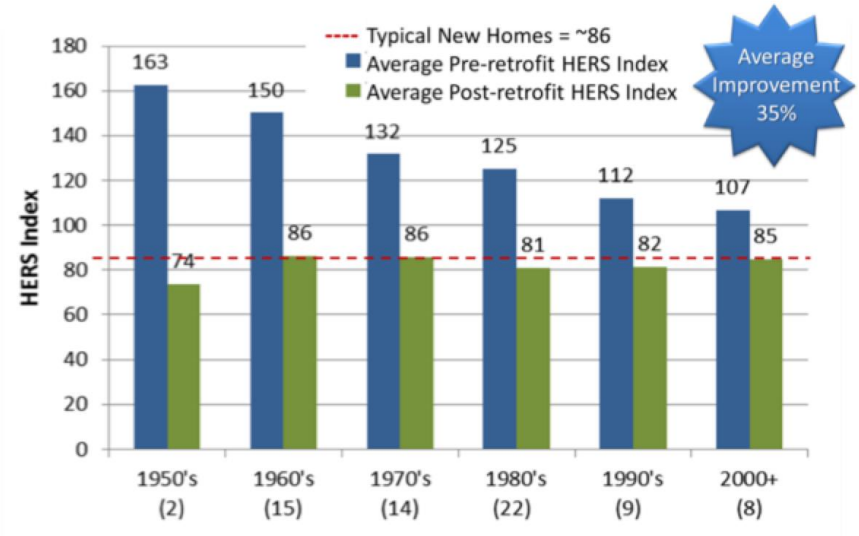
Possible Paths to Net Zero Emissions by 2050



Source: BloombergNEF

- Greater electrification, clean electricity, and heat pumps
- Hydrogen and long-duration storage
- Energy efficiency retrofits

Efficiency Retrofits Are Cost Effective



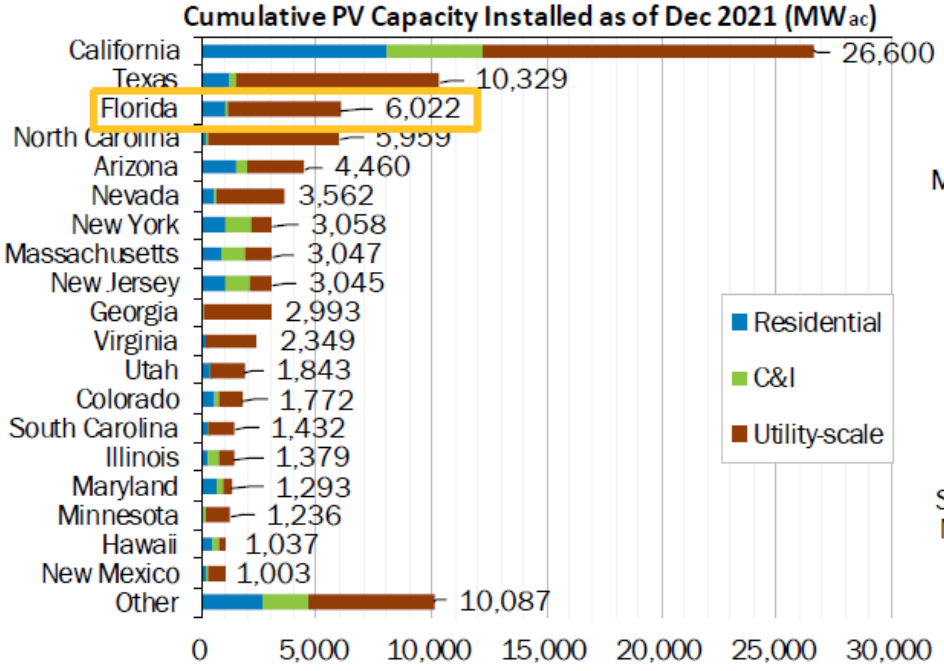
Average HERS Index Pre- and Post-Retrofit

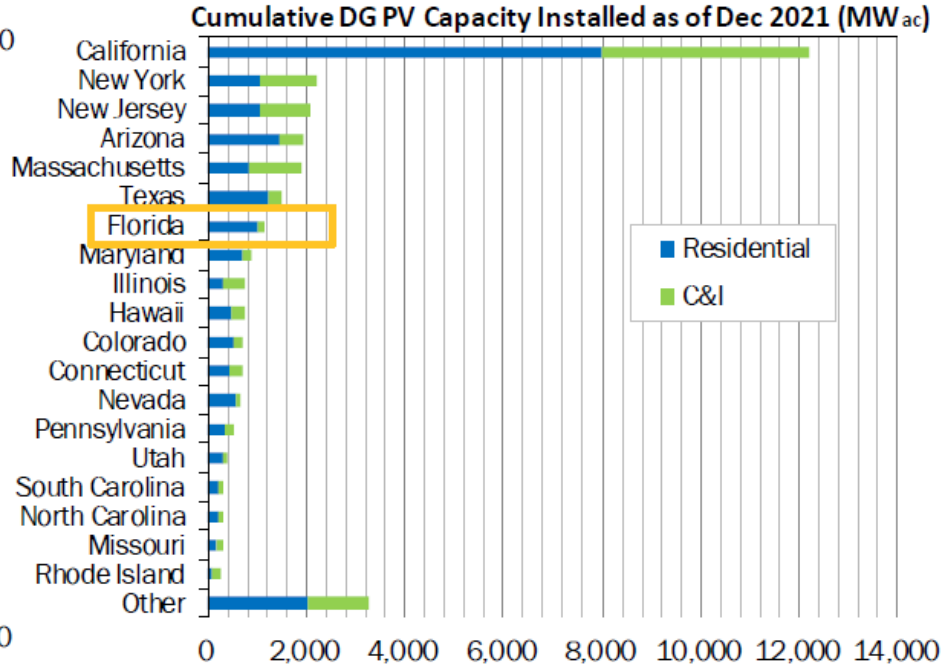
Building America Partnership for Improved Residential Construction

U.S. Installation Breakdown by State

Increased Solar

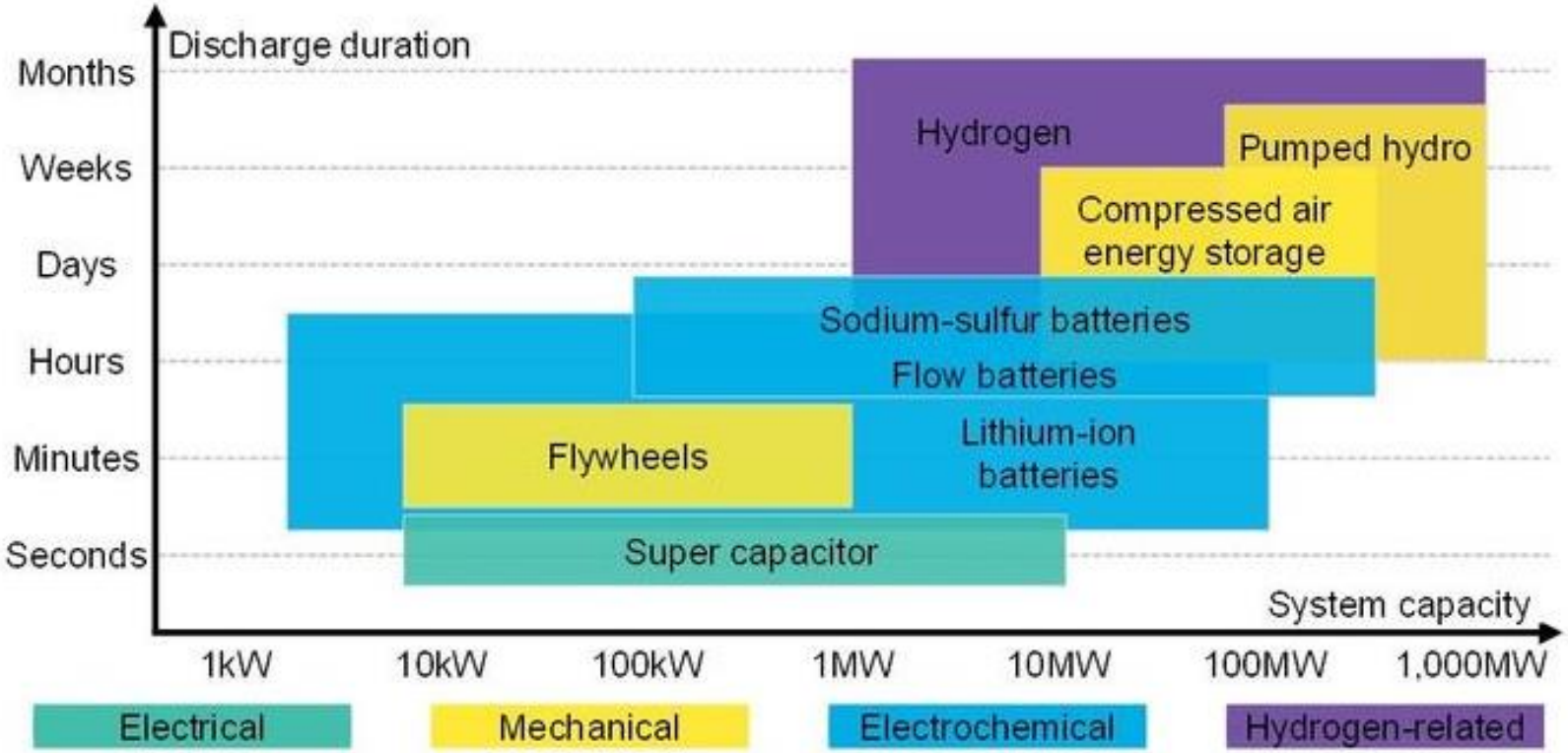
At the end of 2021, 92.5 GWac of solar PV systems were installed in the U.S, of which 59.5 GW were utility-scale PV, 21.0 GW were residential PV, and 12.0 GW were C&I PV.





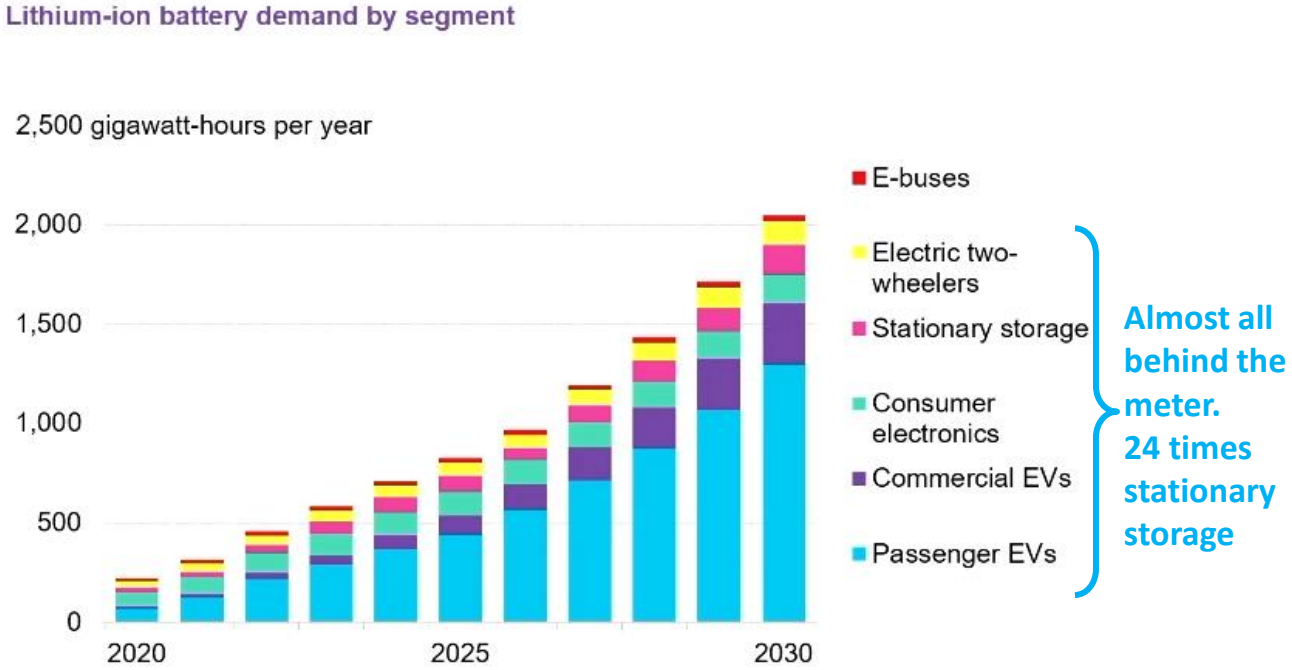
Note: EIA monthly data for 2021 are not final.
Sources: EIA, "Electric Power Monthly," forms EIA-023, EIA-826, and EIA-861 (February 2022, February 2021).

Size and discharge durations by storage technology



Source: Bloomberg New Energy Finance. Note: system capacities and discharge durations are based on general use, rather than technical limitations.

Lithium-ion battery demand will increase ten-fold in a decade.

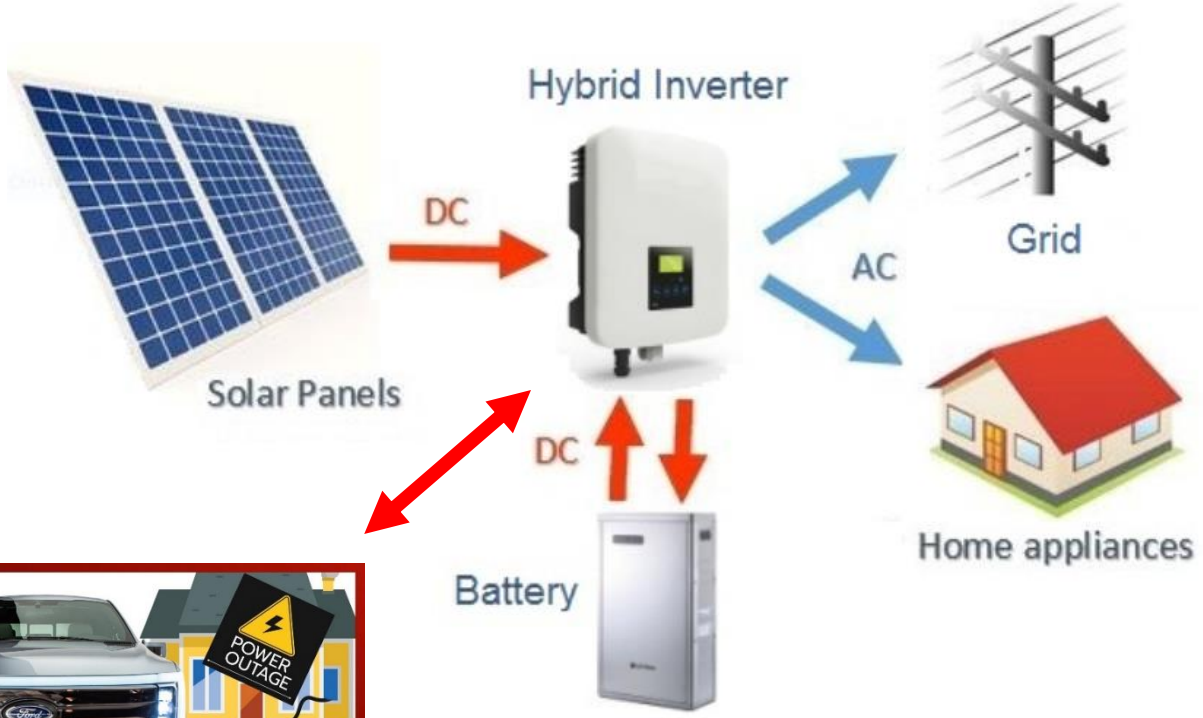


Source: BloombergNEF

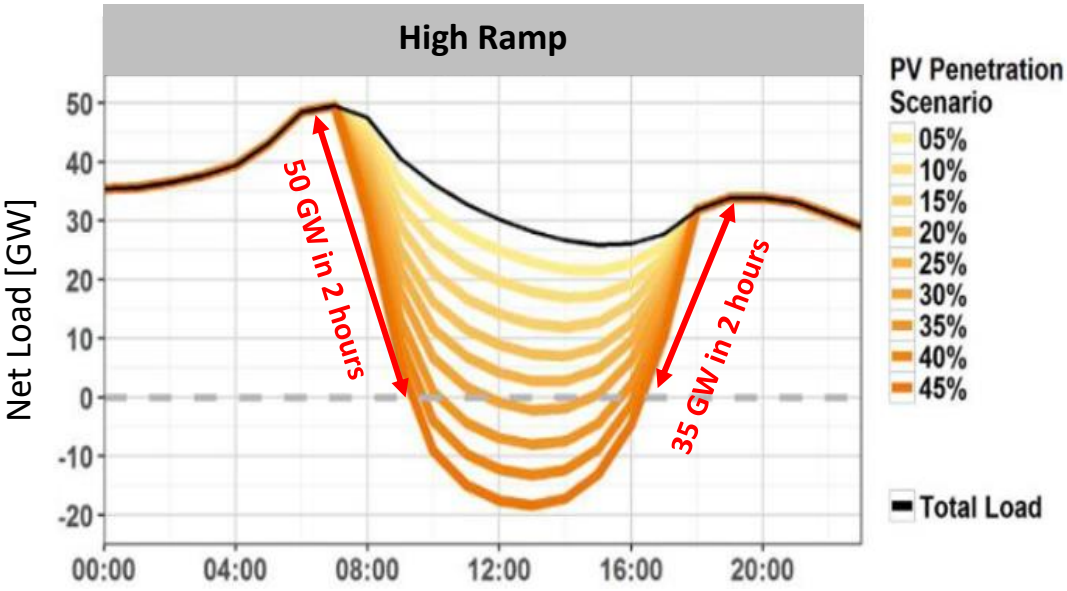
With available Ford Intelligent Backup Power, the F-150 Lightning automatically kicks in to power your home. Enough to power a home for 3 days with the extended-range battery.

FSEC UCF

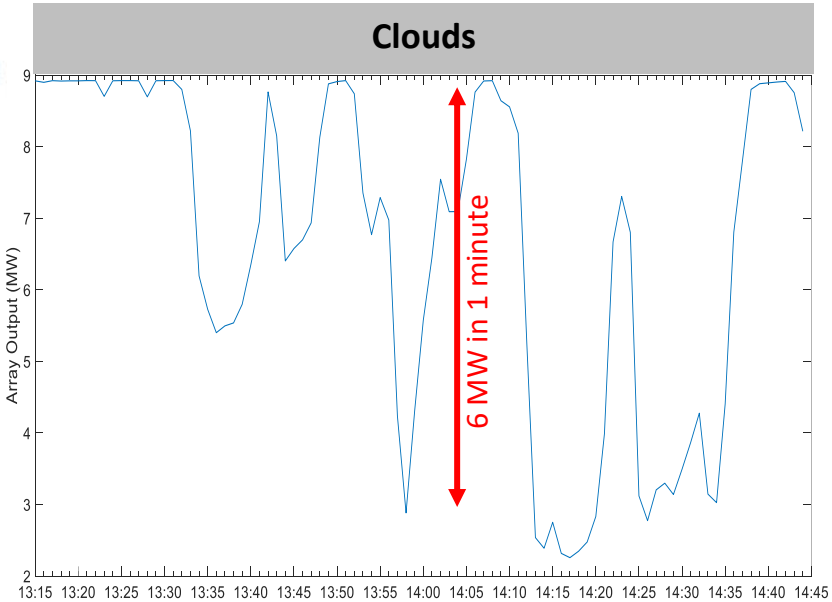
Building Storage Integration



Green Hydrogen Production for Grid Reliability and Transportation



*"Duck curve" in Florida

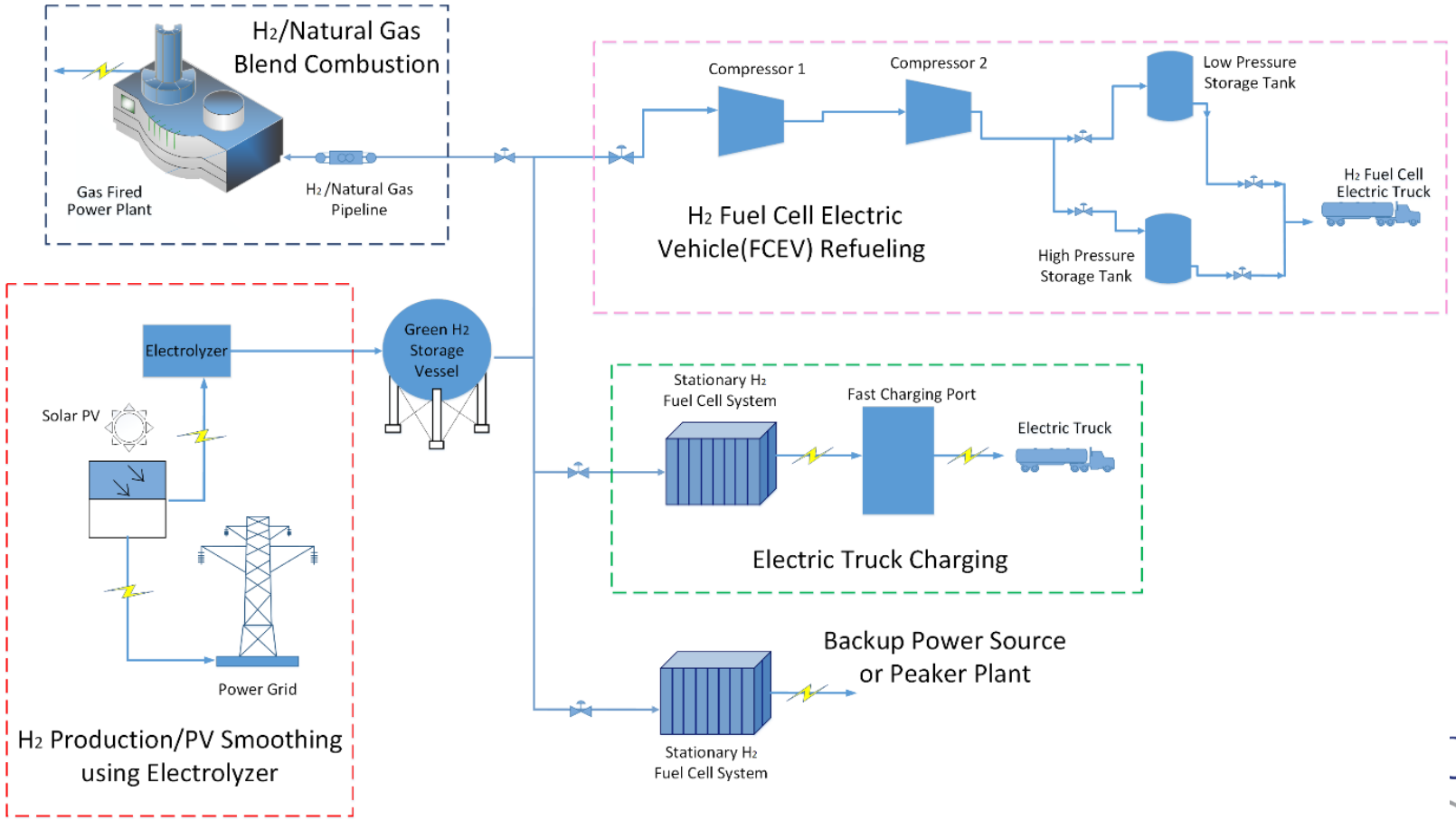


Orlando Utility Commission(OUC)

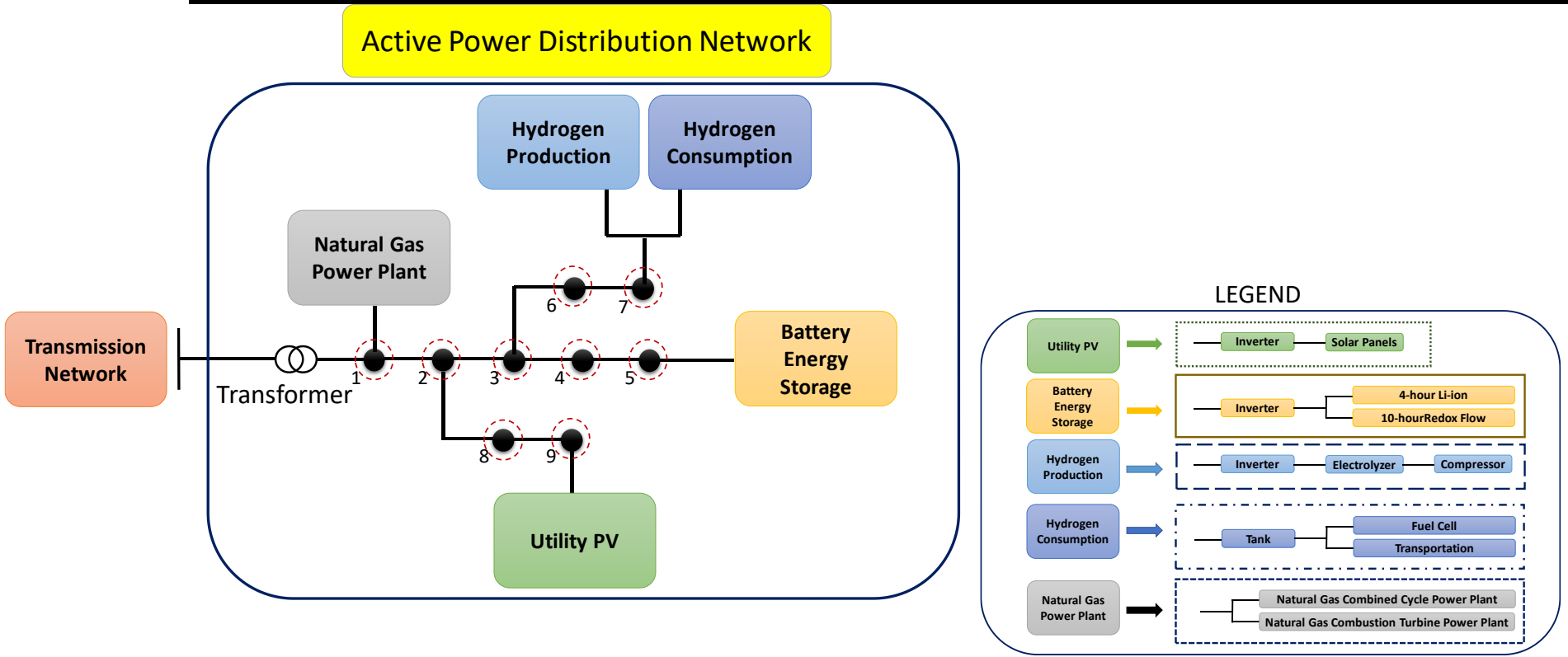
Output Variation (clouds) from an 8.9 MW_{AC} PV Array[2]

*Hale, E. T., Stoll, B. L., & Novacheck, J. E. (2018). Integrating solar into Florida's power system: Potential roles for flexibility. *Solar Energy*, *170*, 741-751.

Green Hydrogen Production for Grid Reliability and Transportation



Green Hydrogen Production for Grid Reliability and Transportation



Regional Collaboration: SE Hydrogen Hub

5 of the U.S. Largest Utilities (Dominion, Duke Energy, NextEra, Southern Co, TVA)

Major U.S. Ports, inland ports, largest rail system in the U.S., interstate corridors

Unique natural gas and fossil pipelines (gateway to the NE)

SpacePort – Sustainable rocket fuel manufactured locally using H2

3.96B GDP (20+% of U.S.)

Approximately 85M population (1/4 of the U.S.)

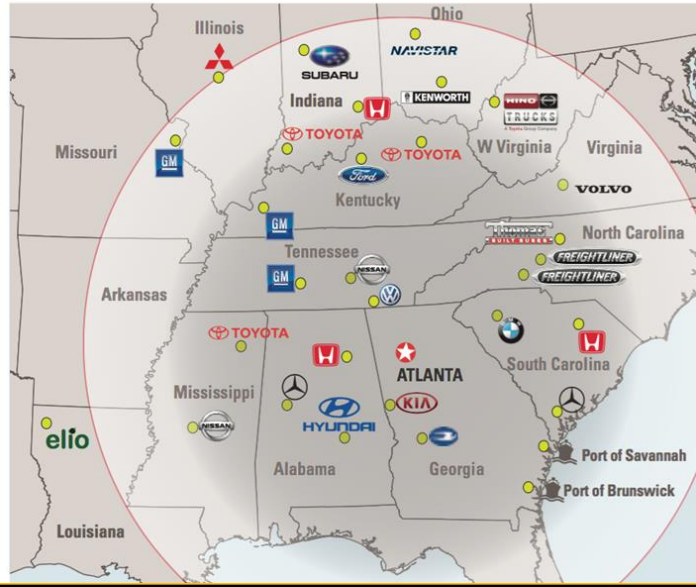
4 major NASA sites and over 85 military sites (22 major installations)

Cars, Light & Heavy Vehicle Manufacturing centered in SE (fuelcells!)

4 DOE National Laboratories (JLab, NETL, ORNL, SRNL)

Proven Renewables – solar, hydropower, growing wind potential

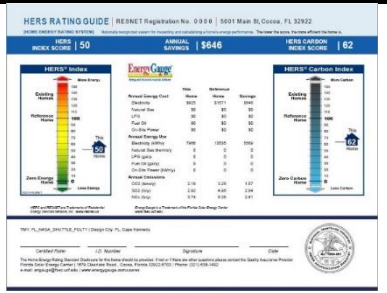
Cars, Light & Heavy Vehicles within a 500 Mile Radius

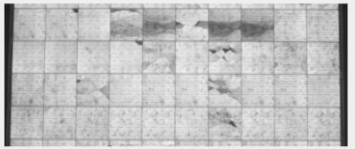


NEWS & EVENTS

In the News

- **New Tool Calculates Greenhouse Gas Emissions from Buildings**
  https://www.ucf.edu/news/new-tool-calculates-greenhouse-gas-emissions-from-buildings/
- **Monitoring degradation for 13 module types**
  https://www.pv-magazine.com/2022/08/15/monitoring-degradation-for-13-module-types/
- **Photos: EnergyWhiz at UCF's Florida Solar Energy Center**
  https://www.floridatoday.com/picture-gallery/news/local/2022/04/30/energywhiz-ucfs-florida-solar-energy-center/9602252002/





Photovoltaic modules degrade over time as they are exposed to elements. This example of a 60-year-old module shows that even after enduring the harsh Florida climate, the panels are still

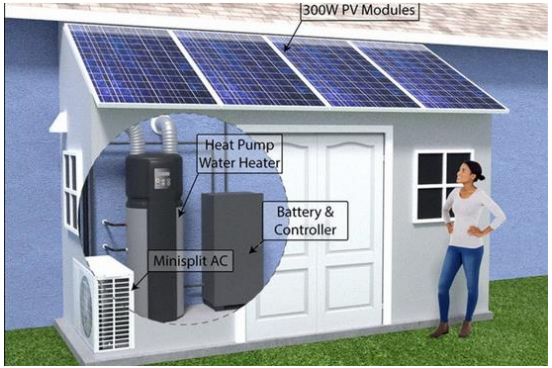
FSEC

UCF

In the News

- **Florida creates new solar installer apprenticeship program**
  https://www.solarpowerworldonline.com/2022/05/florida-creates-new-solar-installer-apprenticeship-program/
- **UCF to study method for reducing energy use by 50-75% in older homes**
  https://www.nelsonpub.com/cms/dfx/opens/article-viewdfx.php?nid=4&bid=1209&et=electrical&pn=01
- **UCF to Study Method for Reducing Energy Use by 50-75% in Older Homes**
  https://www.ucf.edu/news/ucf-to-study-method-for-reducing-energy-use-by-50-75-in-older-homes/

Florida SOLAR ENERGY Apprenticeship Program



FSEC UCF

Awards

- **FSEC Energy Research Center Program Director Recognized by Congress.** Muthusamy Swami was honored for his contributions to the field of building energy conservation and climate change, as well as his leadership in the local community.
  https://blog.energyresearch.ucf.edu/2022/06/fsec-energy-research-center-program-director-recognized-by-congress/

Professional Honor

- **Dr. James M. Fenton Elected 3rd Vice President of Electrochemical Society**
- The ECS membership comprises more than 8,000 scientists and engineers in over 85 countries at all degree levels and in all fields of electrochemistry, solid state science and related technologies.
- https://www.electrochem.org/james-m-fenton/
- ECS Statement on Climate Change https://www.electrochem.org/mission/#c

Professional Development for Teachers

FLORIDA ASSOCIATION of SCIENCE TEACHERS

2022 FAST Conference, St. Augustine, Florida
October 27-29, 2022

- **Junior Solar Sprint (JSS) Car Building Workshop**
- **Solar Cooker Workshop**
- FSEC booth at vendor exhibit

UCF

Webinar

- FSEC partners with IREC's EMPOWERED SOLUTIONS
- Heat pump webinar by Jamie Komo, (former FSEC employee)

Expo at FSEC

- February 1-2, 2023 @ FSEC
- https://cflccc.org/expo-2023/

CENTRAL FLORIDA CLEAN CITIES COALITION

Jim Fenton

FSEC STRATEGIC PLAN UPDATE

FSEC Strategic Plan (2020-2025)

KEY PERFORMANCE INDICATORS FY 2022

Vision Statement

Promote the rapid transition to a sustainable energy economy through renewable energy, energy efficiency, and sustainable transportation research, demonstration, and education.

Mission Statement

Develop, research, and evaluate energy technologies that enhance the environment and economy, and transfer the results to the public, students and practitioners.

Goal I: Enhance FSEC's prominence in core programs of sustainable energy research and development			
Metric	**FY 2020 Baseline**	**FY 2021**	**FY 2022**
1.1 The three-year rolling average of C&G and other external salary funding will equal or exceed 200% of current year E&G salary funding by 2025.	106%	92%	100%
1.2 Achieve at least five new funding sources by 2025.	N/A	5	3
1.3 Create 12 secondary joint appointments at FSEC by 2025.	3	6	6
1.4 Recruit four energy faculty jointly with academic units by 2025.	0	0	0
1.5 Convert five post-doctoral students to assistant research professors by 2025.	0	0	0
1.6 Increase the number of faculty serving as new PIs or Co-PIs to two per year.	0	0	0
1.7 Invest 2% of annual expenditures in research and educational equipment.	<1%	<1%	<2%

Goal II: Deploy FSEC's distinctive assets to support the clean energy sector's response to society's greatest challenges as underscored by the United Nation's First Assessment Report and UCF's Campus Master Plan

Metric	FY 2020 Baseline	FY 2021	FY 2022
2.1 Assist at least two local governments per year in identifying and quantifying sustainable energy goals.	1	2	0
2.2 Decrease non-renewable (NR) per capita (PC) energy consumption in Florida by one percent per year.	194 MBtu	187 MBtu (3.6% reduction)	169 MBtu (9.6% reduction)
2.3 Publish an annual "Research You Can Use" compendium of key findings and replicable programs developed by FSEC.	0	0	0
2.4 Increase the yearly number of Publications, Presentation of Professional Papers and Other Presentations to two per each research & teaching faculty FTE.	50	130	166
2.5 Increase the number of intellectual property developments to one per 15 faculty FTE per year.	5	5	1

Goal III: Maintain FSEC's broad base of academic and industry affiliations and stakeholders that support and inform our research, development, education and training initiatives

Metric	FY 2020 Baseline	FY 2021	FY 2022
3.1 Lead one statewide clean energy event each year.	None	1	2
3.2 Increase number of external partnerships relevant to the FSEC mission by 50% by the year 2025.	50	121	69
3.3 Establish a 50% industry, 25% academic/NGO, and 25% government representation on the FSEC Advisory Board by 2022.	71%/10%/19%	74%/13%/13%	85%/3%/12%
3.4 Increase intra- and inter-university research collaborations by 20% by the year 2025.	35	236	56

Goal IV: Elevate and expand FSEC's educational programming			
Metric	**FY 2020 Baseline**	**FY 2021**	**FY 2022**
4.1 Increase access to energy education and training opportunities for 20,000 students, teachers, and workers over the next five years.	10,600	3,752	5,579
4.2 Support the increase of clean energy jobs in Florida to 200,000 by the year 2025.	166,032	149,624	158,467
4.3 Increase experiential opportunities at FSEC for undergraduate, graduate and post-doctoral students to a rate of 10 per year by 2025.	4	64	28
4.4 Contribute to the creation of an Energy Sustainability certificate or graduate program by Fall 2025.	0	1	1

Goal V: Increase stakeholder and constituent awareness of FSEC and its programs, services and training offerings			
Metric	**FY 2020 Baseline**	**FY 2021**	**FY 2022**
5.1 Increase website visits by 10% per year through 2025.	334,006	324,672 (-3%)	583,062 (70.1%)
5.2 Increase media coverage of FSEC by 10% per year through 2025.	13	40 (362%)	44 (10%)
5.3 Produce four short videos per year through 2025.	1	4	8
5.4 Add 1.00 FTE staff dedicated to information and outreach in 2020.	N/A	0	1
5.5 Produce a Florida Energy Research and Education Capabilities document and update on a regular basis.	V1	V2	V3+
5.6 Distribute an FSEC annual report (hard copy and electronically) to 5,000 stakeholders by the year 2025.	0	0	In progress

Goal VI: Nurture an inclusive and diverse FSEC faculty, staff, and stakeholder base			
Metric	**FY 2020 Baseline**	**FY 2021**	**FY 2022**
6.1 Increase engagement of PhDs and PhD Students in FSEC research activities to 14 by 2025.	11	40	48
6.2 Increase diversity by hiring more women, minorities and multi-cultural faculty, staff, and students.	28 (43%)	20 (32%)	39 (62%)
6.3 Appoint additional women, minorities and multi-cultural members to the FSEC Advisory Board.	13 (38%)	12 (40%)	15 (44%)

Questions?

Agenda

Time	Description	Speaker
9:30 a.m.	Welcome	Bill Grieco, Chair, FSEC Advisory Board; Director, Office of Sustainability & Resilience, City of Orlando
	Introductions (Roll Call)	Sherri Shields, Communications Director, FSEC
9:45 a.m.	Approval of April 15, 2022 Minutes	Bill Grieco, Chair
9:50 a.m.	Status of FSEC Programs	Jim Fenton, Director, FSEC
10:30 a.m.	**Florida Energy Office Report; Inflation Reduction Act**	**Kelley Smith Burk, Director, Office of Energy, FDACS**
	Florida Legislative Session Report	**Louis Rotundo, Principal, Louis Rotundo and Associates**
11:00 a.m.	Collaborative Opportunities for FSEC and Board Member Companies in Meeting Sustainability Goals 1. Review Survey Results 2. Discuss Partnership and Funding Opportunities 3. Develop Working Groups for Future Collaborations	Jennifer Szaro, Vice Chair, FSEC Advisory Board; President and CEO, Association of Energy Services Professionals (AESP)
11:55 a.m.	Date and Agenda for Next AB Meeting (TBD)	
12:00 p.m.	Adjourn to Lunch	

Agenda

Time	Description	Speaker
9:30 a.m.	Welcome	Bill Grieco, Chair, FSEC Advisory Board; Director, Office of Sustainability & Resilience, City of Orlando
	Introductions (Roll Call)	Sherri Shields, Communications Director, FSEC
9:45 a.m.	Approval of April 15, 2022 Minutes	Bill Grieco, Chair
9:50 a.m.	Status of FSEC Programs	Jim Fenton, Director, FSEC
10:30 a.m.	Florida Energy Office Report; Inflation Reduction Act	Kelley Smith Burk, Director, Office of Energy, FDACS
	Florida Legislative Session Report	Louis Rotundo, Principal, Louis Rotundo and Associates
11:00 a.m.	**Collaborative Opportunities for FSEC and Board Member Companies in Meeting Sustainability Goals** 1. Review Survey Results 2. Discuss Partnership and Funding Opportunities 3. Develop Working Groups for Future Collaborations	**Jennifer Szaro, Vice Chair, FSEC Advisory Board**; President and CEO, Association of Energy Services Professionals (AESP)
11:55 a.m.	Date and Agenda for Next AB Meeting (TBD)	
12:00 p.m.	Adjourn to Lunch	

Jim Fenton

REVIEW SURVEY RESULTS

Advisory Board Partners

Energy Consumers

amazonfresh

CITY OF ORLANDO

Publix

UNIVERSAL ORLANDO RESORT

The Walt Disney Company

Builders/ Energy Providers

C.T. HSU + ASSOCIATES, P.A.
ARCHITECTURE • PLANNING • INTERIOR DESIGN

kb HOME

LifeStyle solar-powered HOMES

Nova EV CHARGE Empowering The Future

Palm Harbor Homes

esa

Electric Utilities

DUKE ENERGY

FMPA MUNICIPAL POWER

FPL

KUA KISSIMMEE UTILITY AUTHORITY

OUC The Reliable One

Manufacturers

innventure

HITACHI Inspire the Next

JinKO Solar Building Your Trust in Solar

MITSUBISHI ELECTRIC COOLING & HEATING

saft

TRANE TECHNOLOGIES watsco

Associations/ Government

AESP

DRIVE ELECTRIC FLORIDA

Florida Department of Agriculture and Consumer Services

FlaSEIA Florida Solar Energy Industries Association

GULF COAST ENERGY NETWORK

SHEA SOUTHEAST H2 ENERGY ALLIANCE

UCF

Sustainable Program Areas

Energy Consumers	Energy Efficient Buildings Grid Modernization/Energy Systems Integration Solar Energy/Storage Systems	Electric Transportation Hydrogen Education, Service, Workforce Training, Policy
Builders/ Energy Providers	Energy Efficient Buildings Grid Modernization/Energy Systems Integration Solar Energy/Storage Systems	Electric Transportation Hydrogen Education, Service, Workforce Training, Policy
Electric Utilities	Energy Efficient Buildings Grid Modernization/Energy Systems Integration Solar Energy/Storage Systems	Electric Transportation Hydrogen Education, Service, Workforce Training, Policy
Manufacturers	Energy Efficient Buildings Grid Modernization/Energy Systems Integration Solar Energy/Storage Systems	Electric Transportation Hydrogen Education, Service, Workforce Training, Policy
Associations/ Government	Energy Efficient Buildings Grid Modernization/Energy Systems Integration Solar Energy/Storage Systems	Electric Transportation Hydrogen Education, Service, Workforce Training, Policy

UCF

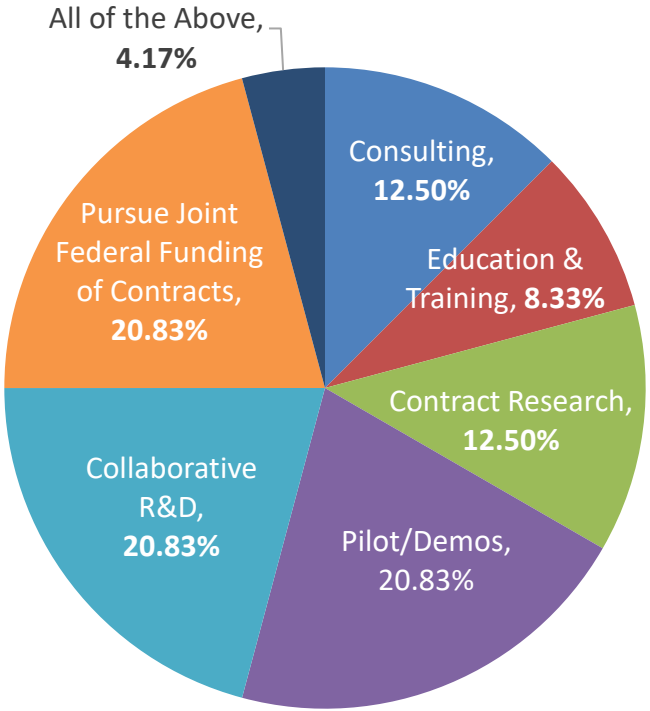
Q4 - What are the top 3-5 sustainability, decarbonization, and/or energy efficiency-related goals that your organization has set?

- High efficiency hydrogen production; increased utilization of hydrogen; high efficiency thermal catalysis; high efficiency process heating; high efficiency and low cost hydrogen delivery and storage
- 1.EV/Solar infrastructure expansion. 2. Distributed Solar/RE Energy Utilization expansion. 3. Communication to Public, Political, Corporate entities.
- While we have not set internal sustainability goals, we manage an ESG fund and focus on starting new companies that deliver ESG impact. That impact is largely Environment/Sustainability related in general, and our companies target reducing energy use in existing applications, commercializing recycling and waste-to-value processes, and developing disruptive materials solutions for existing and new applications. Also, distributed, lower CAPEX modular manufacturing is becoming an integral part of all commercial solutions that we propose, and most of our platform technologies/disruptive new companies will service multiple industries.
- 1. Reduce customer carbon footprint by 1 gigaton. 2. Achieve carbon neutral operations in our manufacturing 3. Achieve workforce diversity reflective of our communities
- As a certified Green business - goal is to be paperless; Encourage employee EV driving with free at work charging and car allowances; Bring to market lower cost, highly reliable EV charging solutions
- Reduce utility costs; Reduce utility commodity consumption (electricity, gas, water, sanitary); Integration of energy efficient components and systems; Integration of renewable energy sources
- Net Zero by or before 2050. Increasing Renewables capacity to 100 GW by 2030. Most of the new Investments are towards either Renewables or Gas
- Carbon neutral goal of 2035 PV solar implementation; Reduce natural gas usage; Energy efficiency improvements
- RE100 (100% renewable by 2025)

Q5 - Of those top 3-5 goals, which are not achievable on your own (e.g., no solutions exist today or are beyond your current resources)?

- High efficiency hydrogen production, delivery and storage
- Communication to Public, Political, Corporate entities
- 1. Deploying modular carbon capture solutions 2. Developing domestic production of selected critical materials using lower energy, more environmentally-friendly processes 3. Developing and commercializing lower cost, rapid deployment solutions for waste-to-syngas or waste-to-hydrogen
- New solution/disruptive technology introduction
- Renewable energy sources
- Cost effective electrification of gas large boilers

Q6 - How might FSEC enable you to meet your goals?



Jen Szaro

DISCUSS PARTNERSHIP AND FUNDING OPPORTUNITIES

- Are categories correct?
- Is everyone in right spot?
- Anyone missing?

Advisory Board Partners

Energy Consumers

amazonfresh

CITY OF ORLANDO

Publix

UNIVERSAL ORLANDO RESORT

The Walt Disney Company

Builders/ Energy Providers

C.T. HSU + ASSOCIATES, P.A.
ARCHITECTURE • PLANNING • INTERIOR DESIGN

kb HOME

LifeStyle solar-powered HOMES

Nova EV CHARGE Empowering The Future

Palm Harbor Homes

esa

Electric Utilities

DUKE ENERGY

FMPA MUNICIPAL POWER

FPL

KUA KISSIMMEE UTILITY AUTHORITY

OUC The Reliable One

Manufacturers

innventure

HITACHI Inspire the Next

JinKO Solar Building Your Trust in Solar

MITSUBISHI ELECTRIC COOLING & HEATING

saft

TRANE TECHNOLOGIES watsco

Associations/ Government

AESP

DRIVE ELECTRIC FLORIDA

Florida Department of Agriculture and Consumer Services

FlaSEIA Florida Solar Energy Industries Association

GULF COAST ENERGY NETWORK

SHEA SOUTHEAST H2 ENERGY ALLIANCE

UCF

- Are categories correct?
- Changes to program areas?

Sustainable Program Areas

Energy Consumers	Energy Efficient Buildings Grid Modernization/Energy Systems Integration Solar Energy/Storage Systems	Electric Transportation Hydrogen Education, Service, Workforce Training, Policy
Builders/ Energy Providers	Energy Efficient Buildings Grid Modernization/Energy Systems Integration Solar Energy/Storage Systems	Electric Transportation Hydrogen Education, Service, Workforce Training, Policy
Electric Utilities	Energy Efficient Buildings Grid Modernization/Energy Systems Integration Solar Energy/Storage Systems	Electric Transportation Hydrogen Education, Service, Workforce Training, Policy
Manufacturers	Energy Efficient Buildings Grid Modernization/Energy Systems Integration Solar Energy/Storage Systems	Electric Transportation Hydrogen Education, Service, Workforce Training, Policy
Associations/ Government	Energy Efficient Buildings Grid Modernization/Energy Systems Integration Solar Energy/Storage Systems	Electric Transportation Hydrogen Education, Service, Workforce Training, Policy

UCF

Survey Results

Q5 - Of those top 3-5 goals, which are not achievable on your own (e.g., no solutions exist today or are beyond your current resources)?

- High efficiency hydrogen production, delivery and storage
- Communication to Public, Political, Corporate entities
- 1. Deploying modular carbon capture solutions 2. Developing domestic production of selected critical materials using lower energy, more environmentally-friendly processes 3. Developing and commercializing lower cost, rapid deployment solutions for waste-to-syngas or waste-to-hydrogen
- New solution/disruptive technology introduction
- Renewable energy sources
- Cost effective electrification of gas large boilers

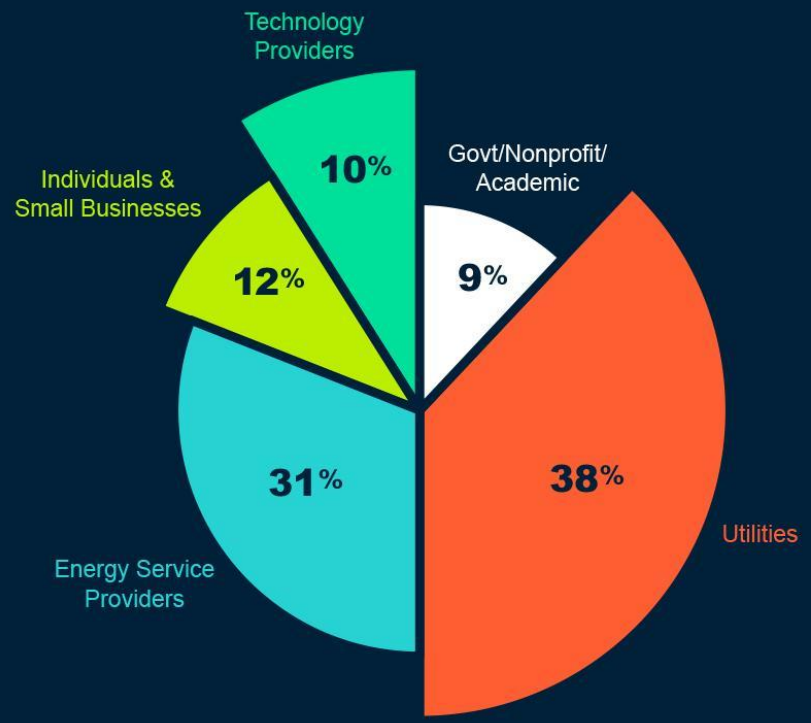
Jen Szaro

DEVELOP WORKING GROUPS FOR FUTURE COLLABORATIONS

OUR WORK AND MISSION

We are a dynamic community of energy professionals dedicated to advancing the industry through professional development, networking and supporting a resilient, sustainable energy future.

Our Members



3,000+ Members
in the U.S. and Canada

Focused on energy efficiency, demand flexibility and DERs

501 c(3) educational non-profit, not a trade association

We advance the energy industry by providing critical knowledge and professional development resources to clean energy and efficiency professionals across North America

THE AESP COMMUNITY

PROGRAMS AND IMPLEMENTATION

STRATEGY AND PLANNING

EMERGING TECHNOLOGY

MARKETING AND COMMS

MEASUREMENT AND VERIFICATION

PUBLIC INTEREST AND STAKEHOLDERS

UTILITIES

ENERGY PARTNERS

- Quarterly working group virtual meetings?

Possible Working Groups

- Energy Efficient Buildings
- Grid Modernization/Energy Systems Integration
- Solar Energy/Storage Systems
- Electric Transportation
- Hydrogen
- Education, Service, Workforce Training, Policy

EXTRAS

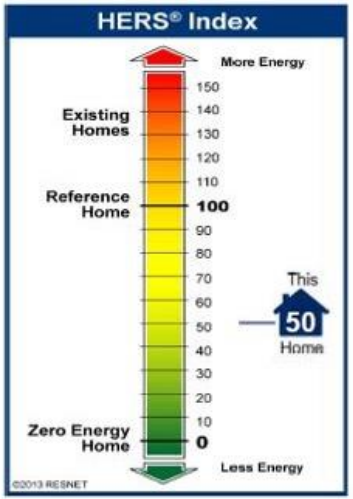
FSEC Principal Program Area	FSEC Program R&D Focus Topics
Energy Efficient Buildings	Building science, indoor air quality, energy efficient devices and systems, weatherization, affordable housing applications, and deep retrofits
Solar Energy/ Storage Systems	Photovoltaic system performance, durability, testing and validation; PV cell/module manufacturing; distributed energy resources; and lithium and flow battery based energy storage; thermal storage [chilled or hot water]
Electric Transportation	Sustainable transportation, electric vehicles, fuel cell vehicles, and fueling infrastructure
Grid Modernization/ Energy Systems Integration	Vehicle to building technology, grid-interactive efficient buildings, demand management, smart mobility and resiliency, virtual power plants
Hydrogen	Explore and enhance Hydrogen production technologies [PV to electrolyzers], consumption [fuel cells, (H2 and H2/CH4) turbines]. H2 use with Biomass and CO2 to make ammonia or methanol.
Education, Service, Workforce Training, Policy	K-12 STEM education, curricula and credential development, public education, outreach and marketing, energy minors for BS/BA, MS, PhD, PV on Schools, energy policy analysis, codes and standards development and administration

UCF

HERS RATING GUIDE | RESNET Registration No. 0000 | 5001 Main St, Cocoa, FL 32922

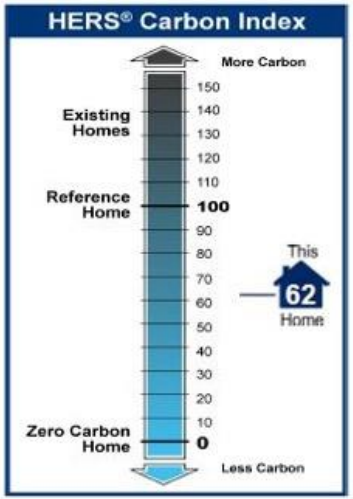
[HOME ENERGY RATING SYSTEM] Nationally recognized system for inspecting and calculating a home's energy performance. The lower the score, the more efficient the home is.

HERS INDEX SCORE	50	ANNUAL SAVINGS	$646	HERS CARBON INDEX SCORE	62



EnergyGauge
Energy and Economic Analysis Software

Annual Energy Cost	This Home	Reference Home	Savings
Electricity	$925	$1571	$646
Natural Gas	$0	$0	$0
LPG	$0	$0	$0
Fuel Oil	$0	$0	$0
On-Site Power	$0	$0	$0
Annual Energy Use			
Electricity (kWh/y	7966	13535	5569
Natural Gas therms/y	0	0	0
LPG (gal/y	0	0	0
Fuel Oil (gal/y)	0	0	0
On-Site Power (kWh/y)	0	0	0
Annual Emissions			
CO2 (tons/y)	2.19	3.26	1.07
SO2 (lb/y)	2.92	4.96	2.04
NOx (lb/y)	3.74	6.35	2.61



HERS and RESNET are Trademarks of Residential Energy Services Network, Inc. www.resnet.us

EnergyGauge is a Trademark of the Florida Solar Energy Center www.fsec.ucf.edu

TMY: FL_NASA_SHUTTLE_FCLTY | Design City: FL, Cape Kennedy

Certified Rater	I.D. Number	Signature	Date

The Home Energy Rating Standard Disclosure for this home should be provided. If not or if there are other questions please contact the Quality Assurance Provider:
Florida Solar Energy Center | 1679 Clearlake Road , Cocoa, Florida 32922-5703 | Phone: (321) 638-1492
e-mail: engauge@fsec.ucf.edu | www.energygauge.com/usares